

performing a specified function." It is the understanding of the applicants that the element in question is recited as "means for deriving two array output signals from the output signals of the array of microphones". Applicants believe that such recitation complies with the requirements of 35 USC 112, sixth paragraph for means-plus-function recitations. If the Examiner has a recommendation for a modification of the identified language, applicants would be happy to consider the same in the interest of advancing prosecution in the present case.

The remaining bases for the present rejection address the recitation of "two array output signals", "the array of microphones", "of the array", and "the outputs of the microphones". Please note that applicants have carefully reviewed all of the claims and amended the same as necessary in order to eliminate the identified bases for this rejection. Reconsideration and withdrawal of this rejection are therefore respectfully requested.

The Official Action rejects claims 1-5 and 7-11 under 35 USC §102(b) as being anticipated by ZWICKER et al. 4,773,095. Reconsideration and withdrawal of this rejection are respectfully requested for the following reasons:

Amended independent claim 1 recites, among other features, an array of microphones, each of the microphones producing an electrical output microphone signal, with the signals being used to generate two array output signals. The

claim next recites a means for deriving the two array output signals from the microphone signals. As part of the recitation of the deriving means, the array of microphones is recited as having two main sensitivity directions, with each of the sensitivity directions being associated with a respective one of the array output signals. Such features are clearly undisclosed by the applied ZWICKER et al. reference.

One example of the two main sensitivity directions recited in claim 1 is illustrated in Figure 1. The sensitivity directions associated with the respective array output signals can be achieved by focusing or bundling the microphone signals, as described in the final paragraph of page 5 of the substitute specification.

The device of ZWICKER et al. cannot possibly produce the two main sensitivity directions of the present invention, as it fails to produce the two array outputs corresponding to such sensitivity directions. Instead, ZWICKER et al. disclose a single array output SA, as illustrated in Figure 2 of the reference. As illustrated therein, the outputs of the array microphones M1 and M2 arranged on the left arm of spectacles and microphones M1' and M2' arranged on the right arm are all fed to the adder 16, producing a single array output SA. The signal SA is provided to both the right and left ears of the user.

While the schematic wiring diagram of Figure 2 of ZWICKER et al. illustrates the combination of the outputs of the

four array microphones into a single summing device, the *in situ* illustration of Figure 3 initially appears to indicate separation between the left microphones M1/M2 and the right microphones M1'/M2'. However, the following passage beginning on line 41 of column 3 of the reference clarifies this point as follows:

In the embodiment shown in FIG. 3, the components of FIG. 2 are disposed in the eyeglasses 5 in respective modules 19 and 20. As stated above, the modules 19 and 20 are connected by lines 21 which may be conducted through the eyeglasses bows and the front portion 6 or may be connected by some other cable run, the details of which need not be shown in FIG. 3.

The remainder of the applied reference has been thoroughly reviewed, and is believed not to disclose any alternative in which the outputs of the left microphones provide outputs distinct from those of the right microphones.

Accordingly, the device of the reference provides only one sensitivity direction, oriented directly in front of the user. This is a necessary consequence of the summation of the signals from all four of the array microphones (M1, M2, M1', M2').

Furthermore, the existence of additional microphones M01 and M02 in the reference does nothing in connection with sensitivity directions. As noted in column 4 of ZWICKER et al.:

[T]he two microphones M01 and M02 function as locating microphones. When the eyeglasses are worn by a hearing-impaired person, the microphone M01 lies directly above the left ear of the user, and the microphone M02 lies directly above the right ear of the user. By means of the two locating microphones M01 and M02, the hearing-impaired person can locate a sound source of interest and turn his or her head with the hearing-aid eyeglasses in the direction of this sound source. With

the head directed toward the sound source, the directional microphone arrangement consisting of the microphones M1, M2, M1' and M2' can operate fully using the directional reception pattern thereof. (emphasis added).

As it is clear from the emphasized text of the above quote from the ZWICKER et al. reference, the locating microphones MO1 and MO2 are not part of the directional microphone arrangement consisting of the microphones M1, M2, M1' and M2'. It is only the four identified microphones of the array that provide a directional reception pattern. As the directional reception pattern is shared between the two ears of the user via signal SA, it is necessarily monaural, as opposed to the arrangement of the present invention in which each of the array outputs corresponds to a respective one of the sensitivity directions and a respective one of the ears of the user.

The Official Action rejects claim 6 under 35 USC §103(a) as being unpatentable over ZWICKER et al. in view of LEHR et al. 5,793,875. Reconsideration and withdrawal of this rejection are respectfully requested for the following reasons:

The secondary reference is offered merely for its asserted teaching or suggestion of a series circuit of a number of summing devices and weighting factor devices. However, irrespective of the ability of this reference to teach or suggest that for which it is offered, it no more teaches or suggests the features of independent claim 1 than does the primary reference. Accordingly, applicants suggest that the combination fails to

render obvious the full set of features recited in the rejected claim, at least by virtue of its dependence from amended independent claim 1.

In light of the amendments described above and the arguments offered in support thereof, applicants believe that the present application is in condition for allowance and an early indication of the same is respectfully requested.

If the Examiner has any questions or requires further clarification of any of the above points, the Examiner may contact the undersigned attorney so that this application may continue to be expeditiously advanced.

Attached hereto is a marked-up version of the changes made to the claims. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

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"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

IN THE CLAIMS:

Claim 1 has been amended as follows:

--1. (twice amended) Hearing aid for improving the hearing ability of [the] a hard of hearing user, comprising:

an array of microphones (8-12), each of the microphones producing an electrical output [signals of the array of microphones being fitted to at least one transmission path belonging to an ear] microphone signal, the electrical output microphone signals being used to generate two array output signals;

means for deriving the two array output signals from the electrical output microphone signals of the array of microphones (8-12; 26-36), the array of microphones having two main sensitivity directions (5, 6) running at an angle with respect to a main axis of the array, and each of the sensitivity directions being associated with a respective one of the array output signals, each array output signal being fitted to its own transmission path, one to the left ear and another to the right ear of [a person who is] the hard of hearing user.--

Claim 4 has been amended as follows:

--4. (twice amended) Hearing aid according to claim 2, characterized in that [each arm (3, 4) of] the pair of spectacles [is provided with an] comprises two arms, wherein the

array of microphones [and in that the output signals from said arrays are each fed to a respective one of the transmission paths] is further mounted on the arms.--

Claim 5 has been amended as follows:

--5. (thrice amended) Hearing aid according to claim 1, characterized in that the means for deriving the array output signals comprises a summing device (18), one of the array output signals being connected to an output of the summing device, each of a plurality of the [microphones output] electrical output microphone signals being fed via a respective weighting [factory] factor device to an input of the summing device.--

Claim 6 has been amended as follows:

--6. (thrice amended) Hearing aid according to claim 1, characterized in that the means for deriving the array output signals comprises a series circuit of a number of summing [devices] device (23, 24, 25, 26) and weighting factor [devices] device (18, 19, 20, 27) pairs, [the outputs] within each pair an output of the weighting factor device driving a first input of the summing device, a first of the [microphones] electrical output microphone signals [(9-11) that are arranged between two outermost of the microphones (8-12)] being connected to [inputs] an input of said weighting factor device of a first of said pairs, [respective said summing devices that are not connected to one of the weighting factor devices, a first one (12) of the

outermost microphones of the array being connected via a first of the weighting factor devices (27) to an input of a first of the summing devices (26) associated with an adjacent said microphone (11), an input of a second of the weighting factor devices (18) being connected to an output of] a second input of the summing devices [(24) connected to one of the microphones adjacent to a second one of the outermost microphones (9), a first input of a third of the summing devices (23)] being connected to [the output of said second weighting factor device (18), the output of the second outermost microphone (8) being connected to a second input of the third summing device (23), so as to produce an array] a respective one of the electrical output microphone [signal] signals [at the output of the summing device (23)].--

Claim 7 has been amended as follows:

--7. (amended) Hearing aid according to claim 6, [characterized in that the array output signal is derived via a] further comprising an additional said weighting factor device connected to an output of the series circuit of summing device and weighting factor pairs.--